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EXAMINER
STRANGE, AARON N

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

   A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
   WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
   - Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
     after SIX (6) MONTHS from the mailing date of this communication.
   - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
   - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
     Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
     earned patent term adjustment. See 37 CFR 1.704(b).

Status

   1)☒ Responsive to communication(s) filed on <u>09 January 2009</u>.
   2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
   3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
       closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

   4)☒ Claim(s) <u>110-134</u> is/are pending in the application.
       4a) Of the above claim(s) _____ is/are withdrawn from consideration.
   5)☐ Claim(s) _____ is/are allowed.
   6)☒ Claim(s) <u>110-134</u> is/are rejected.
   7)☐ Claim(s) _____ is/are objected to.
   8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

   9)☐ The specification is objected to by the Examiner.
   10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
       Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
       Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
   11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

   12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
       a)☐ All   b)☐ Some * c)☐ None of:
       1.☐ Certified copies of the priority documents have been received.
       2.☐ Certified copies of the priority documents have been received in Application No. _____.
       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
           application from the International Bureau (PCT Rule 17.2(a)).
       * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   Applicant's amendments to claims 116-118 are sufficient to overcome the

rejection of those claims under 35 U.S.C. § 112, first paragraph. Accordingly, that

rejection has been withdrawn.

Response to Arguments

2.   Applicant's arguments filed 1/9/09 have been fully considered but they are not

persuasive.

3.   With regard to claim 110, and Applicant's assertion that Wahl fails to disclose "a

remote buffer coupled to the communications link and configured to receive and store

the data changes and the associated meta-data blocks from the local buffer" (Remarks

8), the Examiner respectfully disagrees. Wahl discloses that each **entry** of the writelog

device 18 consists of data and a header (col. 7, ll. 18-19). Wahl further discloses that

the data **entries** are sent across the network to the mirror device on the secondary

computer system (col. 7, ll. 30-35). Thus, Wahl discloses sending the entire entry

including both the data potion and the header potion containing the metadata (metadata

is added to the header of each I/O data update/data entry)(col. 9, ll. 30-32). It is

additionally noted that Wahl uses the term I/O data update and data entry

interchangeably (col. 7, ll. 5-8).

4.   With regard to claim 123 and 124, Applicant's traversal of the Examiner's taking

of Official Notice (Remarks 9) is inadequate. To adequately traverse an assertion of

Official Notice, Applicant must specifically point out the supposed errors in the

Examiner's action, which would include stating *why the noticed fact is not considered to*

be common knowledge or well-known in the art. *See* 37 CFR § 1.111(b); MPEP §

2144.03(c).

       Applicant has failed to explain why it was not well known in the art to use a

checksum as a confirmation that data has been properly received via a network.

Applicant admits that checksums were well known, but asserts that it was not well

known for them "to be used as a signature received by a local buffer in connection to a

data change made to a remote mirror". However, this assertion fails to explain why it

was not well known to use a checksum as a confirmation that data had been received

properly via a network, since it incorporates additional claim limitations that were not

part of the Officially Noticed fact and are taught by Wahl.

       Accordingly, since Applicant has failed to adequately traverse the Examiner's

taking of Official Notice, it has been taken that Applicant admits use of checksums as a

confirmation that data was properly received via a network was old and well known in

the art at the time the invention was made. *See* MPEP § 2144.03(c).

5.   With regard to claim 129, Applicant has failed to traverse the Examiner's taking

of Official Notice. To adequately traverse an assertion of Official Notice, Applicant must

specifically point out the supposed errors in the Examiner's action, which would include

stating *why the noticed fact is not considered to be common knowledge or well-known*

in the art. See 37 CFR § 1.111(b); MPEP § 2144.03(c).

Applicant has failed to provide any traversal. Therefore, it has been taken that

Applicant admits use of browser plugins to provide access to software utilities via a

network was old and well known in the art at the time the invention was made. *See*

MPEP § 2144.03(c).

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by
> another filed in the United States before the invention by the applicant for patent or (2) a patent
> granted on an application for patent by another filed in the United States before the invention by the
> applicant for patent, except that an international application filed under the treaty defined in section
> 351(a) shall have the effects for purposes of this subsection of an application filed in the United States
> only if the international application designated the United States and was published under Article 21(2)
> of such treaty in the English language.

7.   Claims 110-119, 121, 122, 125, 130, 131 and 133 are rejected under 35

U.S.C. 102(e) as being anticipated by Wahl et al. (US 6,324,654).

8.   With regard to claim 110, Wahl discloses a system for storing data comprising:

an interface configured to receive a plurality of data changes, the data changes

indicating a change in data stored on a storage volume of a host (device driver 22

receives calls to modify data on local data device)(col. 9, ll. 12-16);

a meta-data block generator configured to generate a plurality of meta-data blocks (device driver 22 creates metadata headers for I/O data updates)(col. 9, ll. 30-32), each meta-data block associated with at least one of the data changes (entries are created in response to data modifications and each entry contains a header)(col.9, ll. 12-15 and 30-32), the meta-data blocks indicating a time that data changes associated with the meta-data blocks were made on the storage volume relative to other data changes (headers include timestamp information used to order the entries)(col. 9, ll. 32-37; col. 7, ll. 4-5; col. 20, ll. 10-12) ; and

a local buffer (writelog device 18) configured to store the data changes and the meta-data blocks (col. 6, ll. 41-46);

a communications link coupled to the local buffer (network 20)(fig. 1) (col. 7, ll. 22-25); and

a remote buffer (remote mirror daemon 30) coupled to the communications link and configured to receive and store the data changes and the associated meta-data blocks from the local buffer (data entries are mirrored via the network)(col. 7, ll. 23-35).

9.   With regard to claim 111, Wahl further discloses that each meta-data block includes at least one of a timestamp associated with the associated data changes, and a sequence number associated with the associated data changes (header includes both a timestamp and a sequence number)(col. 9, ll. 30-40).

10.   With regard to claim 112, Wahl further discloses that each meta-data block includes a timestamp associated with the associated data changes, and a sequence number associated with the associated data changes (header includes both a timestamp and a sequence number)(col. 9, ll. 30-40).

11.   With regard to claim 113, Wahl further discloses:

        a communications link monitor configured to monitor a status of the communications link (col. 15, ll. 9-10);

        wherein the local buffer is configured to pause transmission of the data changes and associated meta-data blocks if the communications link monitor detects an interruption of the communications link (if a failed link is detected, system enters accumulating mode, where data changes are logged, but transmission is paused)(col. 18, ll. 13-22).

12.   With regard to claim 114, Wahl further discloses that the local buffer is further configured to resume transmission of the data changes and associated meta-data blocks if the communications link monitor detects that the communications link is restored (the system recovers automatically recovers from temporary losses of connectivity)(col. 11, ll. 36-40).

13.   With regard to claim 115, Wahl further discloses:

a communications link monitor configured to monitor a status of the communications link (col. 15, ll. 9-10); and

wherein the local buffer is configured to adjust a rate of transmission of the data changes and associated meta-data blocks in response to the communications link monitor detecting a change in available bandwidth (data transmission may be throttled if too much bandwidth is being used)(col. 16, ll. 17-24).

14.   With regard to claim 116, Wahl further discloses:

a remote mirror including all of the data stored on the storage volume at an associated point in time (remote mirror device 32);

wherein the remote buffer is configured to update the remote mirror using the data changes (changes are written to the mirror device by the remote mirror daemon)(col. 10, ll. 56-60).

15.   With regard to claim 117, Wahl further discloses that the remote buffer is configured to store in the remote mirror an oldest data change of the data changes stored in the remote buffer according to the associated meta data blocks and remove the oldest change from the remote buffer (data is transferred in reverse chronological order)(col. 10, ll. 29-35).

16.   With regard to claim 118, Wahl further discloses a volume reconstructor configured to generate data of the storage volume from a previous point in time from the

remote mirror, and at least one of the data changes with the meta-data blocks

associated with the at least one data change (storage volume data can be restored to a

prior point in time with "launchbackfresh" command)(col. 19, ll. 18-39).

17.   With regard to claim 119, Wahl further discloses:

        wherein the local buffer is configured to maintain a particular data change in the

local buffer until after an acknowledgement indicating that the particular data change

was stored in the remote buffer is received by the local buffer (data changes remain in

the writelog device until successful mirroring is confirmed)(col. 7, ll. 30-35).

18.   With regard to claim 121, Wahl further discloses

        a remote mirror (mirror device 32) including all of the data stored on the storage

volume at a point in time (mirror contains a copy of all data stored on the local device at

a particular time)(col. 20, ll. 23-27);

        wherein the local buffer is configured to maintain a particular data change in the

local buffer until after an acknowledgement indicating that the particular data change

was stored in the remote mirror is received by the local buffer (data changes remain in

the writelog device until successful mirroring is confirmed)(col. 7, ll. 30-35).

19.   With regard to claim 122, Wahl further discloses that the local buffer is configured

to remove the particular data change from the local buffer when the acknowledgement

indicating that the particular data change was stored in the remote mirror is received by

the local buffer (data changes are overwritten after successful mirroring is

confirmed)(col. 7, ll. 30-35).

20.   With regard to claim 125, Wahl further discloses:

        a remote mirror (mirror device 32) including all of the data stored on the storage

volume at a point in time (mirror contains a copy of all data stored on the local device at

a particular time)(col. 20, ll. 23-27);

        wherein the remote buffer is configured to store the data changes in the remote

mirror in an order indicated by the associated meta-data blocks (oldest entries are

stored in the mirror first)(col. 7, ll. 22-25).

21.   With regard to claim 130, Wahl further discloses that the storage volume is

divided into a plurality of blocks; and

        each data change indicates at least one of the blocks of the storage volume with

the data that was changed in the storage volume (mirror occurs at the block level)(col.

8, ll. 58-59; col. 10, l. 65 to col. 11, l. 2).

22.   With regard to claim 131, Wahl further discloses

        a remote mirror divided into a plurality of blocks, the blocks of the remote mirror

corresponding to the blocks of the storage volume on a one-to-one basis (mirroring

occurs at block level)(col. 10, l. 65 to col. 11, l. 2); and

wherein the remote buffer (remote mirror daemon 30) is configured to store the data changes in the corresponding blocks of the remote mirror (data entries are mirrored via the network)(col. 7, ll. 30-32).

23.   With regard to claim 133, Wahl further discloses that the interface is a standard storage subsystem bus interface (i.e., SCSI) (col. 9, ll. 49-51); and

the data changes are write requests received through the standard storage subsystem bus interface (col. 9, ll. 51-54).

Claim Rejections - 35 USC § 103

24.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

25.   Claims 120, 132 and 134 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wahl et al. (US 6,324,654) in view of Tamer et al. (US 6,035,412).

26.   With regard to claims 120, 132 and 134, while the system disclosed by Wahl shows substantial features of the claimed invention (discussed above), including that the local buffer is configured to store only changes that modify data (col. 9, ll. 12-16), it fails to disclose the use of a local mirror in addition to the remote mirror.

Tamer discloses a similar system for backup of data (Abstract). Tamer teaches using local mirrors in addition to remote mirrors (col. 7, ll. 12-27). This would have been an advantageous addition to the system disclosed by Wahl since it would have increased the redundancy of the system, further protecting the data from loss.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use local mirrors in addition to remote mirrors to provide increased redundancy and more protection of the data.

27.   Claims 123 and 124 rejected under 35 U.S.C. 103(a) as being unpatentable over Wahl et al. (US 6,324,654) in view of Applicant Admitted Prior Art.

28.   With regard to claims 123 and 124, while the system disclosed by Wahl shows substantial features of the claimed invention (discussed above), including removing data changes from the local buffer when a confirmation is received, it fails to disclose that the confirmation is a signature, or more specifically, a checksum.

Applicant failed to adequately traverse the Examiner's taking of Official Notice in the Office action of 5/2/2008 (discussed above). Therefore, it has been taken that Applicant admits use of checksums as a confirmation that data was properly received via a network was old and well known in the art at the time the invention was made. Checksums are advantageous since they allow the sender to know whether data was received and, more importantly, whether the received data was correct.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use checksums as the confirmation in Wahl.

29.   Claims 126 and 128 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wahl et al. (US 6,324,654) in view of Ofek et al. (US 7,107,395).

30.   With regard to claim 126, while the system disclosed by Wahl shows substantial features of the claimed invention (discussed above regarding claim 110), including a host (primary system 12) with a primary storage volume (local data device 16); a first mirroring unit (hardware/software used for mirroring) coupled to the host and configured to mirror the primary storage volume of the host (col. 6, ll. 41-46); a second mirroring unit (secondary system 14) coupled to the first mirroring unit, the second mirroring unit configured to mirror the mirrored primary storage volumes of the first mirroring unit (data entries are mirrored via the network)(col. 7, ll. 30-32).

However, Wahl fails to specifically disclose a plurality of hosts, each connecting to a single second mirroring unit. Ofek discloses a similar system for backing up data (Abstract). Ofek teaches interfacing a plurality of hosts to a single secondary storage node which provides backup (col. 9, ll. 6-12). This would have been an advantageous addition to the system disclosed by Wahl since it would have allowed multiple primary systems to mirror data at a single secondary system, reducing costs for each primary site by reducing the hardware and software necessary for mirroring.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single secondary site to mirror data from a plurality of primary sites to reduce the hardware and software costs associated with mirroring data for each site.

31.   With regard to claim 128, Wahl further discloses providing a secondary host with access to a mirror of a mirrored primary storage volume through a network-based data window (numerous utilities for monitoring and management of mirrored volumes may be invoked)(col. 22, l. 1 to col. 23, l. 30).

32.   Claims 127 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wahl et al. (US 6,324,654) in view of Ofek et al. (US 7,107,395) further in view of Wilson (US 6,718,347).

33.   With regard to claim 127, while the system disclosed by Wahl and Ofek shows substantial features of the claimed invention (discussed above), it fails to specifically disclose locking access to a mirror of a mirrored primary storage unit in response to an access by a fist mirroring unit.

Wilson teaches the use of write locks to ensure that only a single device may write to a storage location at a time (col. 9, ll. 8-23). This would have been an advantageous addition to the system disclosed by Wahl and Ofek since it would have

protected mirrored data from being corrupted or changed by multiple simultaneous write attempts from different sources.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to lock access to a mirror of a mirrored storage unit in response to an access by an associated first mirroring unit to prevent the data from being corrupted or changed.

34.   Claim 129 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wahl et al. (US 6,324,654) in view of Ofek et al. (US 7,107,395) further in view of Applicant Admitted Prior Art.

35.   With regard to claim 129, while the system disclosed by Wahl and Ofek shows substantial features of the claimed invention (discussed above regarding claim 129), it fails to disclose that the network based data window includes a browser plugin.

Applicant failed to adequately traverse the Examiner's taking of Official Notice in the Office action of 5/2/2008 (discussed above). Therefore, it has been taken that Applicant admits use of browser plugins to provide access to software utilities via a network was old and well known in the art at the time the invention was made. Using browser plugins to provide access to Wahl's software utilities would have advantageously allowed the remote data mirroring system to be monitored and managed from any client with access to the browser plugins.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use browser plugins to provide remote access to the monitoring and management software utilities provided by Wahl.

Conclusion

36.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AARON STRANGE whose telephone number is (571)272-3959. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Firmin Backer can be reached on 571-272-6703. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron Strange/
Examiner, Art Unit 2448